

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-10 (cancelled).

11 (new). A process for the production of olefins from a hydrocarbon said process comprising the steps of:

a) passing a first feed stream comprising gaseous reactants to a first reaction zone wherein said gaseous reactants react exothermically to provide a product stream

b) producing a mixed feed stream comprising oxygen by passing the product stream produced in step (a) and a second feed stream comprising a hydrocarbon feedstock to a mixing zone and wherein oxygen is passed to the mixing zone via one or more of (i) the second feed stream comprising a hydrocarbon feedstock and (ii) a third stream comprising an oxygen-containing gas

c) passing the mixed feed stream directly to an essentially adiabatic second reaction zone wherein in the absence of a supported platinum group metal catalyst in a second reaction zone that does not contain any catalytic material that is capable of supporting combustion beyond the normal fuel rich limit of flammability, at least a part of the oxygen is consumed and a stream comprising olefins is produced

d) cooling the stream comprising olefins exiting the second reaction zone to less than 650°C within less than 150 milliseconds of formation

and wherein the temperature of the mixed stream is at least 500°C, the mixing zone and the second reaction zone are maintained at a pressure of between 1.5-50bar

and the residence time within the mixing zone is less than the autoignition delay for the mixed stream.

12 (new). A process as claimed in claim 11 in which an additional feed stream comprising hydrogen is passed to the mixing zone.

13 (new). A process as claimed in claim 11 in which the residence time within the mixing zone is less than 100 milliseconds.

14 (new). A process as claimed in claim 13 in which the residence time within the mixing zone is less than 5 milliseconds.

15 (new). A process as claimed in claim 11 in which the reaction is carried out in the second reaction zone at a pressure of between 5 to 30 bara.

16 (new). A process as claimed in claim 11 in which the second reaction zone does not contain any material that would exhibit any substantial catalytic activity.

17 (new). A process as claimed in claim 16 in which the second reaction zone contains a stabiliser and/or packing material selected from the group comprising porcelain, ceramics, alumina and silica that do not exhibit any substantial catalytic activity.

18 (new). A process as claimed in claim 11 in which the second reactor contains an ignition source.

19 (new). A process as claimed in claim 11 in which the pressure of the second reaction zone is maintained at a pressure of between 5.0-10.0bara and the products are quenched by reducing the temperature to less than 650°C within less than 500 milliseconds of formation.

20 (new). A process as claimed in claim 11 in which the pressure of the second reaction zone is maintained at a pressure of between 10.0-20.0bara and the products are quenched by reducing the temperature to less than 650°C within 20 milliseconds of formation.